Open Literature Review Summary

Chemical Name: Imidacloprid

CAS No: 138261413

MRID: 47875305

Record Number and Citation:

A.Decourtye,M.Le Metayer, H. Pottiau-"Impairment of olfactory learning performance in the honey bee after long term ingestion of imidacloprid." Hazards of pesticide to bee. 1999

Purpose of Review (DP Barcode or Litigation):

Risk assessment

Date of Review:

9-29-09

Summary of Study Findings:

This study addresses sub-lethal effects of imidacloprid exposure to honeybees by observing behavior and performance. Chronic feeding tests were done on an individual and colony level. For individual chronic feeding tests of imidacloprid, bees were dosed at 4, 8, and 40 ppb over an 11 day period. After exposure, the proboscis extension assay (PER) was conducted. Mortality was high for the 8 and 40 ppb groups at 25 and 37%, respectively. The 4 ppb group was comparable to the control group of less than 10%, respectively. PER in all of the treatment groups was significantly lower than the control group.

The colonial experiment involved testing the foraging ability at the hive entrance and olfactory discrimination performance on artificial flower feeders. The colony was given a feeder with just 50% sucrose then replaced by imidacloprid contaminated feeder, a third replacement of a feeder with no contaminated solution. During imidacloprid ingestion, the flight activity of the bees showed a decrease relative to the controls in the number of bees crossing into and out of the hive. Learning performance tests were conducted in flight cages and revealed a decrease relative to the controls in visitation to the feeders in the imidacloprid treatment of 50 ppb. This behavior continued for all eight days of exposure. After 7 days of uncontaminated solution ingestion by the honey bees, learning response returned back to normal.

A reduction of olfactory performance at all imidacloprid doses of 4 to 40 ppb were observed on the individual level. The chronic experiment that involved the hive confirmed the individual test of a decrease in learning performance. At 50 ppb, foragers in the flight cage experienced decreases in flight activity and olfactory discrimination performance.

Description of Use in Document (QUAL, QUAN, INV):

Qualitative

Rationale for Use:

This study shows lethal and sub-lethal effects of imidacloprid on an individual and colony level. The study reveals that imidacloprid is not only toxic on an acute oral basis, but it can also impact the ability of bees to forage.

Limitations of Study:

The source of the bees and hives were not disclosed. Also the overall hive health was not stated. The methods were not entirely reported. The source, purity, and storage conditions of the test chemical were not identified. The study authors did not confirm the exposure through analysis of the test substance.

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